

REMARKS

The present invention is a device for coupling ultrasonic waves into a solid body 8 to be ultrasonically probed by a boundary surface located outside a closed volume. The device described with reference to an embodiment of the invention includes at least one ultrasonic-wave transducer unit 6, which couples ultrasonic waves into the solid body via a gaseous coupling medium provided between the at least one ultrasonic-wave transducer unit and the boundary surface. The ultrasonic waves generated by the at least one ultrasonic-wave transducer unit are directed into the closed volume, which is provided with at least a first opening 3 and a second opening 4. The closed volume is bordered by a housing 2, in which the at least one ultrasonic-wave transducer unit is contained. The housing has a surface 7 spaced from the boundary surface which defines and extends outward from the second opening 4 to define a channel between the housing surface and the boundary surface as illustrated in Figs. 1 and 2. Pressurized gas flows from the interior of the closed volume out the second opening 4 through the channel as indicated by arrow 9. The present invention utilizes the hydrodynamic paradox as discussed in paragraph [0008] of the Substitute Specification.

Claims 14-22 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. The claims have been amended to overcome the stated grounds of rejection.

Claims 14-28 and 41-42 stand rejected under 35 U.S.C. §102 as being anticipated by United States Patent 4,944,186 (Dorr). Specifically, the Examiner reasons as follows:

With regards to claims 14-28 and 41-42, Dorr discloses an ultrasonic measuring system comprising, as illustrated in Figures 1-6, at least one ultrasonic-wave transducer unit UT (a transducer that includes a transmitter and a receiver) which couples ultrasonic waves into a solid body HI via a coupling medium (i.e. pressurized gas) provided between the transducer unit and a boundary surface (i.e. the surface of the solid body is considered the boundary surface) wherein the ultrasonic waves generated by the transducer unit UT are being directed into a closed volume having a first opening (the opening where a compressed air line supplies a source of air 20 thru) and a second opening (the opening where air and the ultrasonic waves passes through); a flow of gas 20 (i.e. compressed air) is directed into an interior of the closed volume through the first opening and exits through the second opening which is directly facing the boundary surface. Furthermore, the closed volume is ordered by a housing (i.e. chamber 24) in which the transducer unit UT is contained within the housing to direct the ultrasonic waves to the opening directly facing the boundary surface. (See, column 2, line 65 to column 4, line 58).

This ground of rejection is traversed for the following reasons:

Claim 14 recites:

A device for coupling ultrasonic waves into a solid body to be ultrasonically probed via a boundary surface located outside a closed volume comprising:

including at least one ultrasonic-wave transducer unit, which couples ultrasonic waves into the solid body via a gaseous coupling medium provided between the at least one ultrasonic-wave transducer unit and the boundary surface, wherein the ultrasonic waves generated by the at least one ultrasonic-wave transducer unit are directed into the closed volume, which is provided with at least a first opening and a second opening;

the closed volume being bordered by a housing, in which the at least one ultrasonic-wave transducer unit is contained, including a housing surface spaced from the boundary surface which defines and extends outward from the second opening to define a channel between the housing surface and the boundary surface;

a flow of gas providing an overpressure inside the closed volume which is directed into an interior of the closed volume through the first opening, and which

exits the closed volume through the second opening which directly faces the boundary surface and flows through the channel outward from the opening.

There is no counterpart in Dorr of the housing including a housing surface spaced from the boundary surface which defines and extends outward from the second opening to define a channel between the housing surface and the boundary surface. In Dorr, the source of high pressure air are jet nozzles 21-1 and 21-2 which direct high pressure air against a hot ingot HI. There is no surface associated with the openings of the jets which define a second opening and extends outward to define a channel in association with the boundary surface. Moreover, there is no basis why a person of ordinary skill in the art would be led to modify the teachings of Dorr to provide a housing and housing surface spaced from the boundary surface which defines and extends outward from the second opening to define a channel between the housing surface and the boundary surface.

Claims 29-40 stand rejected under 35 U.S.C. §103 as being unpatentable over Dorr in view of United States Patents 4,787,407. Vogel has been cited for the teaching of a sound conducting means. The teachings of Vogel pertain to sound transmission within a fuel delivery pump to detect the fuel level in a tank being filled by detecting reflections from the fluid level in the tank. However, Vogel does not cure the deficiencies noted above with respect to Dorr regarding the housing and housing surface spaced from the boundary surface which defines and extends outward from the second opening to define a channel between the housing surface and the boundary surface.

Moreover, it is submitted that a person of ordinary skill in the art would not be led to combine the teachings of Vogel, which pertains to the detection of a fluid level

in a tank with the teachings of Dorr which pertain to an ultrasonic measuring system pertaining to the obtaining of spacing between a hot ingot except by impermissible hindsight.

It is noted that the Examiner alleges that Dorr, with respect to claims 37-40, suggests the flow of gas radially relative to the second opening. However, while there may be some radial component of gas flow in Dorr, there is not counterpart of the housing, including a housing surface spaced from the boundary surface which defines and extends outward from the second opening to define a channel between the housing surface and the boundary surface. The nozzles 22-1 and 22-2 open into an area which is different than the claimed housing, housing surface and boundary surface. There is no basis why a person of ordinary skill in the art would consider modification of the second opening, which corresponds to the openings of the nozzles 21-1 and 21-2 which are outside the opening of the chamber C formed by the stainless steel cowling 25, to achieve a radial flow of gas within the claimed channel. See column 3, lines 27-68.

Newly submitted claim 48 further limits claim 14 in reciting that the channel is of substantially uniform space and measured between the surfaces. This subject matter has no counterpart in the combination of Dorr and Vogel.

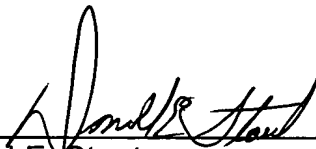
In view of the foregoing amendments and remarks, it is submitted that each of the claims in the application is in condition for allowance. Accordingly, early allowance thereof is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with the

filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (785.39987X00) and please credit any excess fees to such Deposit Account.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read "Donald E. Stout", is written over a horizontal line.

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Attachments

DES:dlh